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ABSTRACT

Factors affecting student achievement (grade point average and national examination scores) at the end of high school in Greece were investigated. In addition to determining the achievement of high school graduates who applied to higher education in 1980 and 1981, information was collected on their preferences for admission to higher education institutions and disciplines. Previous achievement and track were examined for three student samples: applicants, successful students in all higher education, and successful students in university education. Multiple regression analysis was employed to determine how each of the following variables affected high school grade point average and national examination scores: gender, student's work status, occupation of mother and father, education of mother and father, number of siblings, previous attainment, track, geographic origin, preparation for the national examination, week-hours of private tutoring, and education and operational school characteristics (e.g., enrollments, staffing). Among results was the finding that personal variables were more pronounced in Athens and the urban centers, and social and school variables were more pronounced in the rural areas and the smaller cities. Additional findings and information on the Greek education system and college admission are presented, and data tables and diagrams are included. (SW)

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The Determinants of Educational Achievement at the End of Secondary Schooling : The case of Greece

(DRAFT)

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Theoretical and conceptual framework

The role of the Greek educational system, as identified in recent historiography and educational opportunity research, has been inclusive rather than exclusive, homogen izing and at the same time stratifying students with differential social background.

The inclusive role is delineated in the extensive expansion of the school system in the early years of the Greek State, in comparison with other European countries. The homogenizing role is a result of the very structure of the educational system. That is the one and only general education school, which the State historically provides for the student population at both the primary and the secondary levels. Stratification is the result of the transfer of the selective role to a higher educational level when access to the previous one tends to become massive.

In the 1920's the Greek State introduces a numerous clausus for University education, and entrance examinations to regulate admission procedures. The early increase in enrollments at the secondary level in the history of the educational system has made necessary the transfer of the selective role to University education and eventually has required control of the new entrants.

The historically established access of wide strata of the population to University education has been hindered by the numerous clausus policy. And this happened when it became imperative that this level should play the decisive role in the ~~population~~ reproduction of the elites to occupy the corresponding places in the hierarchical division of labor. The selection system (university entrance examination) became highly competitive and controlled on the basis of the increasing difficulty of the examination subjects. It is exactly for these reasons that in the decades of the 50's and the 60's access to University education reaches its highest level of inequality in the Greek case.

The increase in the numbers of new entrants which started in 1964 was coupled with the sharp increase in the number of Greek students abroad. It was accompanied by (administrative changes such as) geographic decentralization of the examination as well as incorporating and

adjusting it to secondary education which lead to increasing equality of opportunity. These changes gave Greece in the beginning of the 70's the third place among the OECD countries regarding equality of opportunity in university education. These developments became a trend towards mass higher education and created new needs in the mechanism of reproduction and integration in the division of labor.

In our research we have established that there is a correspondence between the hierarchy of the professions in the division of labor and the social background of students in the corresponding schools and departments. We have also indicated that university education mirrors this relationship, since a change in the hierarchical ordering of the professions is followed by a change in the social background of students in the corresponding disciplines.

So, we propose that the Greek system incorporates in its role elements which tend to equalize educational attainment by social background and elements which tend to reproduce a hierarchically educated student body for a smooth integration in the hierarchical division of labor.

The dynamic of this evolution is close related to mass enrollments at a certain educational level (and then we observe increasing equality of opportunity) followed by the transfer of the selective role to the next level (this way the reproductive function is performed). This dynamic has lead to the present structure of higher education which responds to the equalizing and the reproductive needs through a hierarchical stratification at three levels, higher technical and vocational, teacher training, and university education.

The selection process correspondig to this structure has been totally transformed to a secondary education graduation examination. Given that participation in the examination is compulsory (for those who wish to graduate) the investigation of the social and educational factors which influence student achievement scores, on the basis of which applicants are allocated to higher education places, leads to the research of the role of the selection system.

The fact that the examination is compulsory has ruled out self-selection and a good part of social selection too. So the decisive factors in the access to higher education are identical to those affecting student achievement in the examination and in senior high school (scores which contribute to the total score on the basis of which selection is made).

In this context research focusing on equality of opportunity of access to higher education evolves into research on the reproductive and equalizing role of the selection system. And, finally, into research of the factors which influence the hierarchical stratification of applicants and successful students according to their achievement scores (the main criterion for their hierarchical integration in the three levels of higher education and the disciplines of university education

It is clear that this way of conceptualizing the research problem at hand transcends the usual comparison of applicants and successes which implies the selection process as a black box; comparison which focuses on the social background of students before and after selection. It is clear from the preceding analysis that it is necessary to search what is happening into the black box; that is, how the consecutive stratification of applicants in successes and failures, in the hierarchical levels of higher education and, finally, in the hierarchically stratified university specialties, is realized.

The selection system leads to a hierchical ordering of the sub-levels as well as the disciplines of higher education, as a result of the large number of preferences which applicants may state in the application form. The way in which preferences are structured (either with respect to the level, or the discipline) makes the above investigation feasible.

Self-selection does not appear as a decisive factor since preferences of university disciplines is independent of achievement. So the investigation of the process by which applicants are hierachically stratified according to achievement (and are finally integrated in the hierarchical levels of higher education) makes possible research the role of selection in the Greek educational system.

This is realized by investigating the factors which affect achievement in the successive stratification process of applicants, successes at the three levels of tertiary education, successes at the university level. Stronger influence of social and educational variables on achievement indicates a reproductive tendency, while weaker influence indicates an equalizing trend.

In summary the argument presented above introduces a new approach in researching patterns of equality and inequality vs the conceptual comparative approach used so far which deals with the selection system as a black box.

The conceptual scheme proposed here includes the selection process as an organic part of the reproductive and equalizing role of the educational system. The realization of this role refers to the way secondary school graduates are stratified through the evaluation and the examination system in the hierarchical levels of higher education, and the hierarchical disciplines of university education in direct relation to the hierarchical social division of labor.

The conceptual scheme developed identifies the need to investigate the achievement of three populations: applicants, successes in higher education, successes at the university level.

Research questions refer to the social and educational factors influencing school achievement and entrance examination achievement for each population.

Methodology

The model of multiple regression analysis was used in order to investigate the above questions, using achievement at key instances as dependent variables. Due to the lack of research experiences regarding the factors affecting student proformance in this country, we started with a multiplicity of independent variables. These included personal and family characteristics, previous school attainment, type of school, geographic origins, information on coaching and private tutoring, regarding length, intensity and cost, and educational/operational

senior high school indices regarding the qualitative and quantitative composition of teachers.

The uniformity of curriculum (both content and extent of material taught), books, teaching methods throughout the Greek State, as well as the uniformity of teacher training in the universities has spared us a lot of prospect independent variables. The high level of aspirations of Greek youth from different social backgrounds, indentified once more in this study provided one more controlled variable. We have not included psychological variables because neither a scale developed in Greece nor an adequately searched adaptation of an existing one is available. We feel that this is a shortcoming of the study. (But one should keep in mind that aspirations are independent of social background in this student pop.)

The dependent variables examined in the regression analysis are:

- achievement in senior high school, as grade-point average
- achievement at the national examination, as the score in the subjects examined (separately for each track)
- achievement in each of the four subjects of the national examination.

The independent variables which entered in the multiple regression equations are:

- gender
- student's work status
- father's occupation
- mother's occupation
- father's education
- mother's education
- number of siblings
- previous attainment
- track
- geographic origin
- cramming* in months

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* Cramming refers to preparation for the national examination organized privately either in special institutions (established for this purpose) or as tutorials on an individual basis. As of 1983 the State has established its own cramming centers for secondary school graduates wishing to participate repeatedly in the national examination. Private cramming continues parallel to the State operations for these graduates, with the same intensity as ever.

- o week-hours of private tutoring
- o educational/operational school characteristics.

The preceeding analysis is applied to the three populations defined in the conceptual scheme of the research, that is: applicants, successful students in the whole higher education level, and successful students at the university education level.

The necessary information regarding the above varibles was derived from three sources:

a. The files of secondary education graduates-applicants to higher education for 1980 and 1981 (held at the Ministry of Education: information on all achievement scores and GPA's).

b. The files of senior high schools regarding enrollments, and personnel numbers, status and specialization, for 1980 (held at the Ministry of Education: information on school educational/operational characteristics).

c. A questionnaire distributed to all the applicants simultaneously with the application forms, stating the ranking of their preferences for admission to institutions and disciplines of higher education; the 13% stratified (by type of school and type of community) sample was randomly picked from the total number of filled out questionnaires which reached the 95% of the total number of applicants.

Results of the analysis

The statistical analysis, following the conceptual scheme we have presented above, deals with the variables affecting achievement in each one of the three instances in the stratification process.

Table 1* presents a summary of the results of multiple regresion analysis in the three stratification phases.

Previous achievement and track are the main variables determining achievement for all three samples examined (applicants, successful students in all higher education, successful students in university education). Gender has a negative impact on the achievement of girls in the examination, affecting their integration in the hierarchical stratification of applicants in all three phases. Students work has a negative (but small) effect on achievement except for the GPA of successful students in all higher education. Father's education has a (small) effect on school achievement (GPA) in the two first phases of the stratification process, while father's occupation affects the third phase, that is the stratification of students in university disciplines, both achievement in the examination and achievement in high school. School factors affect achievement in the first and third phases, but do not influence the achievement of successful students of all higher education. Cramming, finally, influences all achievement variables with the exception of the examination score of successful students in university education.

It is clear that the influence of the personal, social background and educational/school characteristics examined varies with the sample and the achievement variable examined.

Gender has a negative impact on the national examination for girls enrolled in the science track. Social background variables affect more achievement in the humanities track rather than in the science track. The same variables affect more achievement in school rather than achievement in the national examination.

Interestingly the influence of personal, social and school variables on achievement is differentiated by the type of community students

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*** All tables are taken or adopted from Polydorides, G. et al. EVALUATION OF THE ENTRANCE EXAMINATION FOR HIGHER EDUCATION, Center for Educational Research, Ministry of Education, Athens 1985.**

come from. So personal variables are more pronounced in Athens and the urban centers, and so is cramming. Social and school variables are more pronounced in the rural areas and the smaller cities (Table 2).

The path analysis with which we conclude our investigation reveals an expected pattern of influences (Tables 3, 4, 5, diagrams 1, 2); that is, the analysis of examination scores as the dependent achievement variable indicates strong indirect effects of previous attainment and gender (through the tracking procedure). There is no similar indirect effect of considerable size in the case of achievement in senior high school (GPA) as a dependent variable.

Type of community and father's education have only indirect effects on both dependent variables, but of no considerable size. In both cases school characteristics (measures of students per teacher in the main subjects and students per teacher in a permanent post) have a considerable effect, while gender has a sizeable effect on achievement in the national examination. It is clear that tracking (actualized through the student's own "choice") plays a most important role. It is obvious that the science track attracts the most able students and at the same time it is the locus of stratification of students by gender.

Compared to findings of similar research in the international scene we find that social background variables appear less pronounced in the Greek case. Variables of previous educational attainment are much more important, a fact that, in the case of GPA's, is due to the uniformity of the evaluation process involved.

The differentiation of the effects of school variables with the type of community (Table 2) is comparable to findings of international data analysis, where school variables are more pronounced in the less developed countries.

Epilogue

The historical evolution of the Greek school exchibits increased participation of the different social groups simultaneously with a "conservative" content even in its "liberal", version having as primary focus the function of completing (filling) the cognitive knowledge necessary to the young people. The role of the Greek school has been the inscription of the dominant ideology in the masses. The transfer from the rural lands of the periphery to the urban areas and further to positions of control, was assuring the presuppositions for the smooth and controlled establishment of a dominant social and economic system.

The result of this research shows that the factors influencing the educational transfer of students from the periphery and the rural centers are well defined, a fact which does not hold for Athens and the large urban centers. The transfer to the urban centers and positions of control, realized through higher education is actualized on the basis of the entrance examination. The examinations apply the final control of the degree to which the dominant ideology, as acquisition of the cognitive aspects of the educational process, has been achieved.

It was presented that some achievement measures are more socially defined than others. The social definition of achievement refers to those characteristics of the evaluation practice and marking which are formulated on the basis of social relations stemming from the economic-social milieu and are filtered to the cultural and ideological sphere.

Within this context it is a "logical" result that achievement in the national "impersonal" examination is to a lesser degree socially defined than achievement in school. In the later the evaluation process is interwined with the personal element, while in the former social relations have lost their directedness. Within the same context it is a "logical" result that achievement in humanities (so called theoretical) subjects is more socially defined as compared to achievement in science subjects. The latter constitute the less ideological part of the cognitive content of the educational process, since it develops to the students certain elements of rational through which help them comp ete for places in the science and technology sectors of higher education,

irrespectively of their social background. But, looking further into the second phase of the hierarchical stratification of successful students, we observe that achievement in science subjects is also influenced by social background characteristics. For it is at exactly that level where there is the need to differentiate and stratify among the levels of higher education, that is between higher technical and university education. It is here that another obstacle, referring to a specific social group, appears, that is women. In this case women with cultural orientation contrary to, or not identical with, the dominant culture, face difficulties in competing for places in the science departments, and often, contrary to their social background.

So, it appears that the social and educational factors affecting achievement and the stratification pattern of applicants and successes are differentiated according to the needs of the specific phace in the selection process.

It is evident that, even though there is not a uniform deterministic relationship of achievement with the social and educational characteristics, the relationship exists where necessary. And, while the selection system does not play a direct and uniform reproductive role in the Greek society, with direct correspondence, it plays that role at key instances as necessary.

Table 1. Social and educational variables influencing achievement in the national examination and at the end of senior high school. Summary findings of regression analysis.

Sample achievement variable	R^2	indepedent variables (statistically significant regression coefficients)
applicants senior high GPA[1]	0.494	achievement in junior high, student's workstatus, gender (+ for girls), father's education, cramming
applicants national exam score[2]	0.402	track, achievement in junior high, gender (- for girls), school characteristics, cramming, student's work status
all successful students senior high GPA	0.408	achievement in junior high, track, craming, father's education
all successful students national exam score	0.243	track, achievement in junior high, student's work status, cramming
successful students in univ.education senior high GPA	0.537	achievement in junior high, track, student's work status, father's occup., cramming
successful students in univ.education national exam score	0.446	track, achievement in junior high, father's occup., school characteristics, student's work status, gender (- for girls).

1. Examination subject scores included as 16% of the total GPA.
2. Examination subjects (weighted score) plus GPA in senior high.

Table 2. Social and educational variables influencing achievement in the national examination and at the end of senior high school by community type. Summary findings of regression analysis. Successful students to university education, 1981.

Type of community achievement variable	R^2	independent variables (statistically significant regression coefficients)
Athens: center, NE suburbs		
national exam score	0.485	achievement in junior high, track, gender, cramming, tutoring
senior high GPA	0.565	achievement in junior high, track, student's work status, tutoring
Piraeus: center, SW communities		
national exam score	-	
senior high GPA	0.754	achievement in junior high, track
Thessaloniki		
national exam score	0.639	achievement in junior high, track, tutoring, school characteristics
senior high GPA	0.739	achievement in junior high, track, student's work status, father's education, family's material status, tutoring
Cities		
national exam score	0.700	achievement in junior high, track
senior high GPA	0.739	achievement in junior high, track, mother's occup., cramming
Towns		
national exam score	0.558	achievement in junior high, track, gender, father's occup., mother's education, family's material status, school characteristics
senior high GPA	0.683	achievement in junior high, track, mother's occup., mother's education, cramming, school characteristics
Rural communities		
national exam score	0.478	achievement in junior high, track, father's occup., mother's occup., family's material status, tutoring, school characteristics
senior high GPA	0.665	achievement in junior high, track, father's occup., mother's education, family's material status

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Table 3. Structural coefficients of the model for achievement in the national examinations. Regresion coefficients in standardized form 1981.

equation (dependent variable)	Predetermined variables: week-hours priv. tutoring	months, cramming	track	achievement in junior high	school characteristics	student's workstatus	family's material status	community type	mother's education	father's education	father's occupation	gender (girl)	R^2
1. exam, total score	-0,06	-	0,40	0,36	-0,09	0,07	-	-	-	-	0,09	-	0,446
2. week-hours priv. tutoring		0,10	0,09	-	-	-	0,10	-	0,12	0,13	-	-	0,081
3. months, cramming			0,13	-	0,11	-	-0,07	0,10	-	-	-	-	0,057
4. track				0,39	-	-	-	-	-	-	-	-0,33	0,266
5. achievement in junior high					-	-	-	-	-	0,12	-	-	0,048
6. school characteristics						-	-	0,16	-	-	-	0,18	0,098
mean	1,17	8,60	0,49	17,49[1]	17,20	0,60	5,75	0,62	8,62	10,11	191,52	0,56	
standard deviation	2,28	8,98	0,48	1,21	8,00	0,49	1,68	0,49	4,17	4,48	68,94	0,50	

1. out of 20,00

Table 4. Structural coefficients of the model for achievement at the end of senior high school. Regresion coefficients in standardized form 1981.

equation (dependent variable)	Predetermined variables: week-hours priv. tutoring	months, cramming	track	achievement in junior high	school characteristics	student's workstatus	family's material status	community type	mother's education	father's education	father's occupation	gender (girl)	R^2
1. GPA, grade 12	-	-	0,23	0,58	-	0,07	-	0,06	-	-	0,06	-	0,537
2. week-hours priv. tutoring		0,10	0,09	-	-	-	0,10	-	0,12	0,13	-	-	0,081
3. months, cramming			0,13	-	0,11	-	-0,07	0,10	-	-	-	-	0,057
4. track				0,39	-	-	-	-	-	-	-	-0,33	0,266
5. achievement in junior high					-	-	-	-	-	0,12	-	-	0,048
6. school characteristics						-	-	0,16	-	-	-	0,18	0,098
mean	1,17	8,60	0,49	17,49[1]	17,20	0,60	5,75	0,62	8,62	10,11	191,52	0,56	
standard deviation	2,28	8,98	0,48	1,21	8,00	0,49	1,68	0,49	4,17	4,48	68,94	0,50	

1. out of 20,00

Table 5 Total effects on achievement in the national examination and at the end of senior high school. 1981

predetermined variables	exam total score			GPA, grade 12		
	direct effect	indirect effect	total effect	direct effect	indirect effect	total effect
achievement in junior high	0.36	0.156	0.516	0.58	0.90	0.670
track (science)	0.40	0.047	0.447	0.23	0.007	0.237
week-hours priv. tut.	-0.06	-	-0.060	-	0.05	0.005
months, cramming	-	-0.005	-0.005	0.05	-	0.050
school characteristics	0.09	-0.013	-0.103	-0.10	-0.008	-0.108
student's work status	0.07	-	0.070	0.07	-	0.070
family's material status	-	0.000	0.000	-	-0.003	-0.003
community type	-	0.030	0.030	-	0.035	0.035
mother's education	-	-0.035	-0.035	0.06	-0.016	0.044
father's occupation	0.09	-	0.090	0.06	-	0.060
father's education	-	0.062	0.062	-	0.071	0.071
gender (girl)	-0.07	-0.146	-0.153	-	-0,076	-0.076

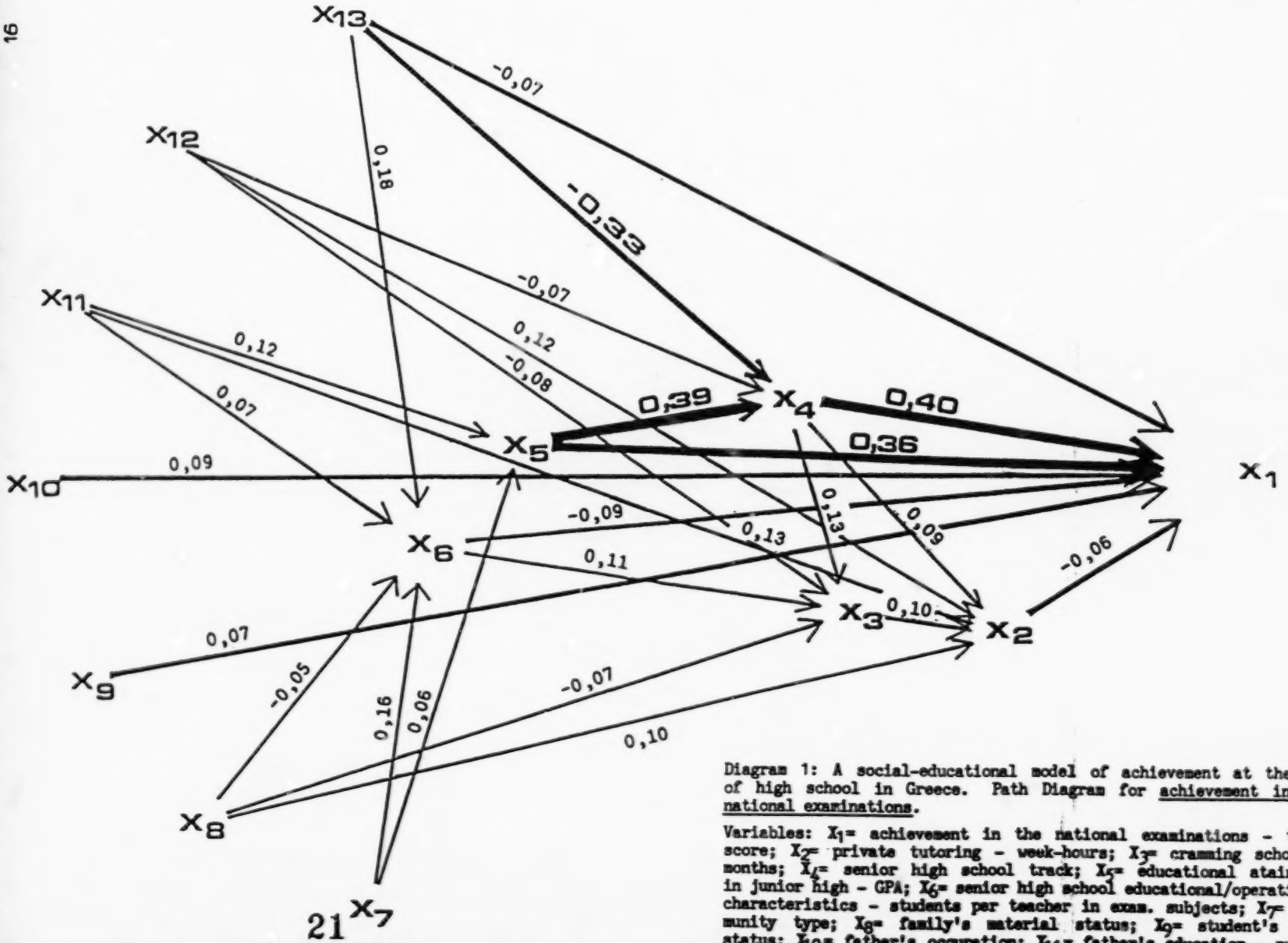

Diagram 1: A social-educational model of achievement at the end of high school in Greece. Path Diagram for achievement in the national examinations.

Variables: X_1= achievement in the national examinations - total score; X_2= private tutoring - week-hours; X_3= cramming school - months; X_4= senior high school track; X_5= educational atainment in junior high - GPA; X_6= senior high school educational/operational characteristics - students per teacher in exam. subjects; X_7= community type; X_8= family's material status; X_9= student's work status; X_{10}= father's occupation; X_{11}= father's education - number of years completed; X_{12}= mother's education; X_{13}= gender.

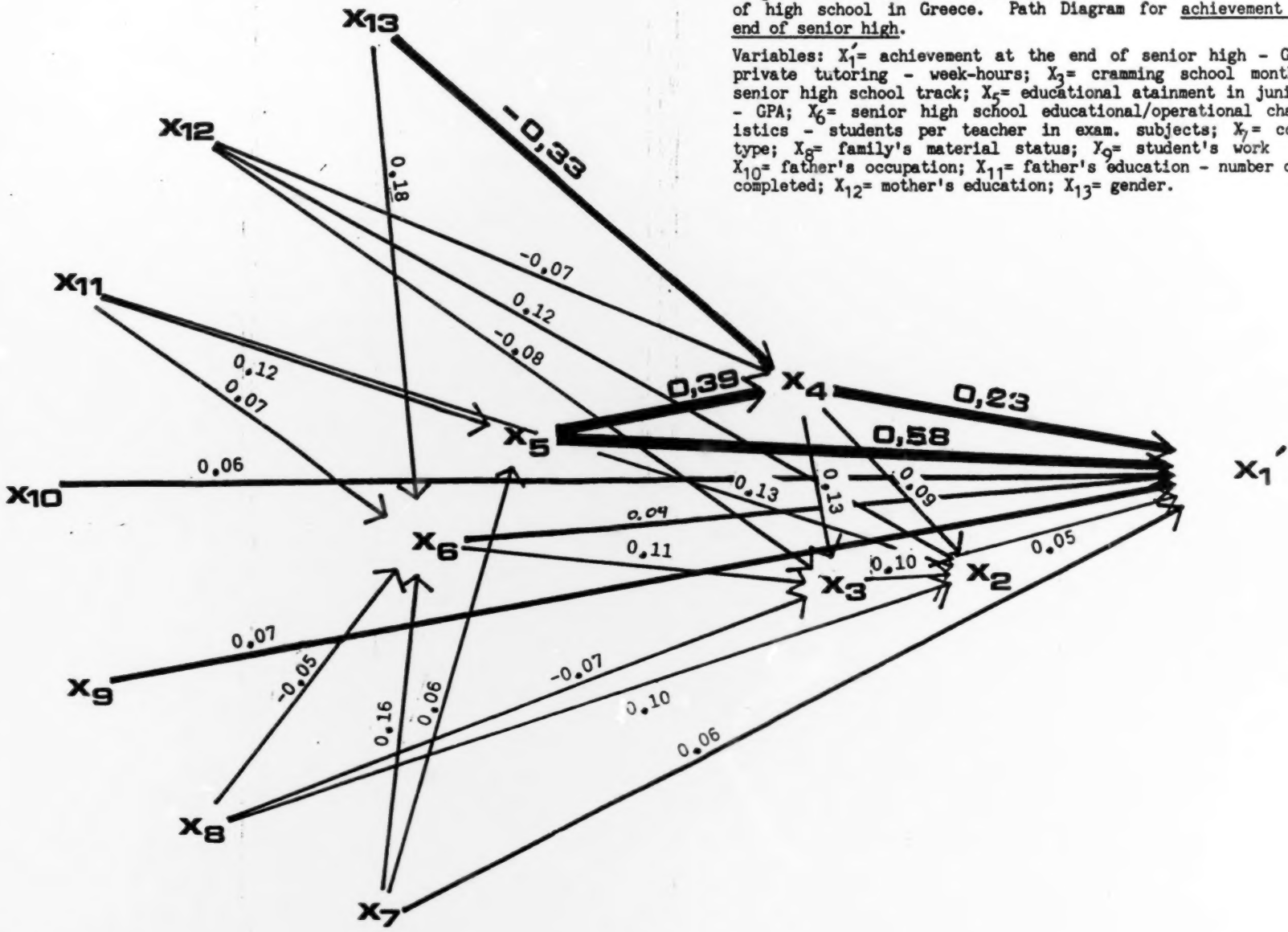

Diagram 2: A social-educational model of achievement at the end of high school in Greece. Path Diagram for achievement at the end of senior high.

Variables: X_1'= achievement at the end of senior high - GPA; X_2= private tutoring - week-hours; X_3= cramming school months; X_4= senior high school track; X_5= educational atainment in junior high - GPA; X_6= senior high school educational/operational characteristics - students per teacher in exam. subjects; X_7= community type; X_8= family's material status; X_9= student's work status; X_{10}= father's occupation; X_{11}= father's education - number of years completed; X_{12}= mother's education; X_{13}= gender.